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## SEXUALITY AND SUBSTANCE USE: THE IMPACT OF TOBACCO, ALCOHOL, AND SELECTED RECREATIONAL DRUGS ON SEXUAL FUNCTION

Alexander McKay  
Research Coordinator  
SIECCAN  
Toronto, Ontario

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### INTRODUCTION

Throughout history and across cultures, alcohol, recreational drug use and sexuality have been closely intertwined. For example, alcohol has often been considered to be "... a powerful facilitator, promoter, disinhibitor, and common accompaniment to sexual behavior of all types" (Rosen, 1991, pp. 120-121). Smoking cigarettes has traditionally been associated with glamour, sophistication, and enhanced attractiveness. Advertising often attempts to associate alcohol consumption with sexual attractiveness. Many recreational drugs are thought to be aphrodisiacs and, in general, substance use is often considered a facilitating social-psychological prelude to sexual activity. While there is a well established mythology concerning the relationship between sexuality and substance use, many people, including educators and health professionals, are less certain about the current medical/scientific understanding of the impact of substance use on sexual functioning.

The purpose of this article is to review and summarize the available scientific literature on the impact of

consumption of tobacco, alcohol, methamphetamine, cocaine, and marijuana on sexual function. The findings of the available research are summarized in the context of the immediate impact of consumption and in terms of the impact that may result from regular, prolonged use of a substance. This information will be of general interest but also of particular use to educators and counsellors in assisting their students and clients in making informed decisions about substance use.

A presentation and discussion of research on the impact of substance use on sexuality must take into account several important considerations. First, many substance users report a beneficial impact of consumption on sexuality (e.g., increased sexual enjoyment). Second, all the substances considered in this review are, or can be highly addictive and prolonged, heavy consumption of these substances carries a high risk for significant detrimental health outcomes. Third, this important reality should be factored into informed decision-making around substance use. Fourth, it should be noted explicitly that with the exception of tobacco and alcohol,



possession of the substances considered in this article is illegal.

There are some significant methodological issues in the research on this topic which should induce a good measure of caution in drawing definitive conclusions about the impact of substance use on sexuality. First, the impact of specific substances on specific phases of human sexual response has, in many cases, not been directly examined in the scientific literature. Second, as other reviewers have noted, much of the research in this area relies on small, non-representative samples and self-report data from volunteer users obtained in uncontrolled studies (Peugh & Belenko, 2001). It has also been noted that the effects of substance use on sexuality are mediated by, among other things, dosage level, duration of use, history and characteristics of the user, and the social/environmental context in which the substance is consumed (Rosen, 1991). With these caveats in mind, there is sufficient research available to make some observation, albeit tentatively, about the impact of different substances on sexual function.

#### **THE CONCEPTUAL DISTINCTION BETWEEN SEXUAL ENJOYMENT/PLEASURE AND THE AROUSAL AND ORGASM PHASES OF SEXUAL RESPONSE: AN IMPORTANT CONSIDERATION IN THE EXAMINATION OF THE IMPACT OF SUBSTANCE USE ON SEXUALITY**

In order to clearly articulate the known impact of substances on sexual function it is important to clarify what is meant by sexual function and its relationship to sexual pleasure/enjoyment. Various models of human sexual response have been proposed (Hyde, Delameter & Byers, 2004). These models range, in terms of complexity, from very basic to highly intricate. In reality, human sexual response is multifaceted and subject to a wide array of biological, psychological, contextual, and interpersonal factors (Basson, 2004). The degree to which the substances considered in this review interact with each of the interconnected facets of human sexual response is largely unknown. Thus, for the purposes of this review, Kaplan's (1979) triphasic model of sexual response will be used to delineate, in basic terms, current medical/scientific understandings of how different substances impact upon key parameters of sexual response. Most sexologists agree that healthy sexual functioning is dependant to some degree on

the three components of the triphasic model of sexual function: desire, arousal, orgasm (Winze & Carey, 2001) (Table 1). This review identifies the phases of sexual response that research suggests are impacted by each of the substances considered.

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**Table 1 Triphasic Model of Sexual Response**

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**Desire:** An interest in sexual activity which leads an individual to initiate sex or be receptive to it.

**Arousal:** Typically includes feelings of sexual excitement accompanied by erection in the male and vaginal lubrication in the female.

**Orgasm:** Usually includes a series of pelvic muscle contractions that release sexual tension.

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#### **SEXUALITY AND SUBSTANCE USE: GENERAL OBSERVATIONS**

As described below, many new or infrequent users of some substances report that they increase desire (i.e., they are aphrodisiacs) (e.g., alcohol, methamphetamine, cocaine, marijuana) or that they enhance sexual pleasure/enjoyment (e.g., methamphetamine, cocaine, marijuana). For the purposes of this review it is important to note that feelings of sexual enjoyment and pleasure are highly subjective and thus are quite likely to be influenced by the psychoactive agents in recreational drugs. However, commonly used recreational drugs, in their modes of action, do not typically directly target the arousal or orgasm phases of sexual response. (By way of contrast, the drug sildenafil [Viagra], in its mode of action, does target the arousal phase of sexual response by directly facilitating erection). This distinction is of particular importance in the assessment of the impact of substance use on sexuality. One of the potential pitfalls of drug use is that the initial perception of sexual benefits from consuming a drug may contribute to prolonged and/or heavy use which in turn may have a significant negative impact on health and thereby on sexual function which in turn may make sexual pleasure/enjoyment difficult to achieve. As the authors of a previous literature review on alcohol, drugs, and sexual function noted,



The available research does suggest that alcohol and most drugs often have deleterious acute and chronic effects on normal sexual functioning. A moderate alcohol drinker or a new user of some illicit drugs may experience sexual pleasure or facilitation connected to their substance use. However, with higher doses and long-term use, alcohol and drugs can impair sexual response, reduce sexual desire, and contribute to sexual dysfunction (Peugh & Belenko, 2001, pp. 229-230).

Based on the research reviewed in this article, Table 2 provides an overview of the potential negative impact on sexual function of prolonged regular use of selected substances. In addition to the cautions about the methodology and reliability of available research on the effects of illicit drugs on sexuality noted above, readers should also be aware that in many cases, there is insufficient research to draw even very tentative conclusions about the impact of a particular substance on sexual function. For example, although there is a considerable and growing body of research on the impact of smoking on male erectile function, there has been little or no research that has attempted to investigate the impact of smoking on female sexual function. Thus, our assumptions about this and other under-investigated effects of substance use on sexual function remain speculative.

**Table 2** Potential Negative Impact of Prolonged, Regular Use of Selected Substances on Sexual Response

	Desire	Arousal	Orgasm
Tobacco		✓×	
Alcohol	✓×*	✓*	✓*
Methamphetamine		✓	
Cocaine	✓	✓×	✓
Marijuana			✓0

✓ = Research suggests substance impairs phase of sexual functioning

× = Impact is demonstrated in males only

\* = Impact is evident only when high doses are consumed

0 = Some evidence to suggest a negative impact but contrary evidence exists as well

## TOBACCO

In terms of the short-term impact of smoking on sexual function, it is important to understand that the physical aspects of the arousal phase of the human sexual response cycle (i.e., erection in the male, swelling of the clitoris and genital engorgement in the female) requires efficient blood flow to the genital area and that smoking reduces the efficiency of blood circulation throughout the body. In men, smoking interferes with several important biological processes that are needed to produce and maintain an erection (e.g., vasodilation, corporal smooth muscle relaxation) (Celermajer, Sorenson, Georakopoulos et al., 1993; Powell, 1998). In short, smoking impairs the function of the blood vessels that are needed to get and keep an erection (Virag, Bouilly, & Frydman 1985). A population-based study of men in Finland found that cigarette smoking was clearly linked to a higher risk of erectile dysfunction (Shiri, Koskimaki, Hakama et al., 2004). A study that measured the hardness and number of minutes that erections lasted while men slept (nocturnal penile tumescence), found that the more cigarettes a man smoked during the day, the less rigid and long lasting his erections were at night (Hirshkowitz, Arcasoy, Karacan et al., 1992). In another study of heavy smoking men, not smoking for 24 hours resulted in harder erections (Guay, Perez, & Heatly, 1998). In sum, it is clear that smoking can have an immediate negative impact on a man's ability to get and maintain a strong erection and that not smoking, even for a short period of time, can improve erectile capacity. While there has been no research on the direct impact of smoking on female sexual function, it is clear that smoking reduces blood flow to the lower extremities, and to the extent that female sexual arousal involves blood flow to the genital area, it is logical to speculate that cigarette smoking may inhibit physical sexual arousal among women.

There is abundant evidence linking long-term cigarette smoking with an increased risk of erectile dysfunction in men (Derby, Mohr, Goldstein et al., 2000; Feldman, Johannes, Derby et al., 2000; Mannino, Klevens, & Flanders, 1994). A recent study found that the higher the number of cigarettes smoked per day and the higher the number years a man has smoked, the higher his risk of developing erectile dysfunction (Gades, Nehra, Jacobson et al., 2005). Although the long-term impact of smoking on



erectile function is more clearly evident in older men, there is also evidence linking heavy smoking to erectile dysfunction in men under age 45 (Natali, Mondaini, Lombardi et al., 2004).

As noted above, not smoking, even for short periods of time, can improve sexual function. In addition, there is evidence that quitting smoking can have a longer-term benefit on sexual function. A study of male smokers with erectile dysfunction, found that compared to those who did not quit, those who quit were more likely to show improvements in erectile function one year later (Pourmand, Alidaee, Rasuli et al., 2004). As also noted above, there has been no published research on the impact of smoking on female sexual function. However, it is well known that long-term, heavy smoking has a negative impact on many aspects of women's health and so it is quite likely that smoking may also have a negative impact on the physiological aspect of female sexual function. For both men and women, smoking is most likely to have an impact of the arousal phase of the human sexual response cycle.

#### ALCOHOL

In Western culture, alcohol and sexual behaviour are frequently linked. Put another way, the consumption of alcohol often socially facilitates and precedes sexual activity and it is commonly believed that alcohol is a powerful sexual facilitator and disinhibitor that potentially acts as an aphrodisiac (Rosen, 1991). Although some of these beliefs are held by many people, they are, in some cases, incorrect. While alcohol consumption can act as an disinhibitor, leading some people to be more open or receptive to sexual activity, the belief that alcohol acts as an aphrodisiac, increasing or intensifying sexual response is false. Indeed, as summarized below, alcohol typically has the opposite effect in that consuming alcohol, particularly in large quantities, tends to dampen sexual response.

Consuming small amounts of alcohol is unlikely to have an immediate short-term impact on a person's sexual response. However, it is clear that as the amount of alcohol a person consumes increases, their physiological ability to respond sexually decreases. With respect to its impact on the sexual response cycle, it is important to understand that alcohol is a

central nervous system depressant that slows down brain functioning, respiration, and circulation (Peugh & Belenko, 2001). As a result, alcohol's depressive effect on the central nervous system can, particularly in higher doses, lead to, for example, erectile dysfunction in men and decreased vaginal lubrication in women (Peugh & Belenko, 2001).

Several studies measuring the impact of alcohol on male sexual response have found that small amounts (e.g., one drink) have little or no impact, but that in larger doses, alcohol impairs a male's ability to become aroused and ejaculate (Farkas & Rosen, 1976; Rubin & Henson, 1976). Similarly, studies of women have shown that larger doses of alcohol reduce the ability to become aroused and experience orgasm (Malatesta, Pollack, Crotty, & Peacock, 1982; Wilson, Lawson, 1978). In sum, the available scientific research indicates that higher amounts of alcohol intake have an immediate short-term negative impact on the arousal and orgasm phases of the human sexual response cycle.

Recent research suggests that moderate (1 to 2 drinks per day) long-term alcohol consumption may have beneficial effects on cardiovascular health (De Lange & van de Wiel, 2004). To the extent that light drinking is a component of a heart healthy lifestyle, it is unlikely to interfere with the circulatory-cardiovascular aspects of sexual response.

While light or moderate alcohol consumption may be compatible with a healthy lifestyle, long-term heavy or binge drinking impacts negatively on every organ system in the body including those associated with sexual response and reproduction (Crenshaw & Goldberg, 1996; Peugh & Belenko, 2001). Studies of alcoholics have shown that alcohol consumption can enable some people to overcome sexual inhibitions or feelings of inadequacy (Pinhas, 1980). However, there is a large body of evidence indicating that long-term alcohol abuse is associated with a range of sexual problems and dysfunctions. For women these include difficulties with lubrication, inhibited orgasm, and painful sex (Johnson, Phelps, & Cottler, 2004; Peugh & Belenko, 2001). For men, they include erectile dysfunction, inhibited orgasm, and hypoactive sexual desire disorder (low desire) (Rosen, 1991). In sum, the available scientific



literature indicates that heavy drinking can have a long-term negative impact on the arousal and orgasm phases of the human sexual response cycle for women and on the desire, arousal, and orgasm phases for men.

#### **METHAMPHETAMINE (CRYSTAL METH)**

Methamphetamine is a white, odourless crystalline powder that is swallowed, smoked, snorted or injected. Methamphetamine is a highly addictive, powerful central nervous system stimulant that promotes the release of the neurotransmitters dopamine, serotonin noradrenaline and adrenaline (Seiden, Sobol, & Ricaurte, 1993). The immediate effects of methamphetamine use include increased energy, alertness, and sociability as well as feelings of euphoria which may last from 6 to 30 hours (Anglin, Burke, Perrochet et al., 2000). However, these positive effects are often accompanied by, among other things, elevated blood pressure, heart rate and body temperature as well as anxiety, irritability, insomnia, aggressiveness and, in some cases, paranoia or suicidal tendencies (Maxwell, 2005). Overdosing methamphetamine can result in cerebral hemorrhage, stroke, seizure, hyperthermia, arrhythmias, coma, and death (Freese, Miotto, & Reback, 2002).

With respect to the effects of this drug on sexual function, many users report that methamphetamine acts as an aphrodisiac (increasing sexual desire), reduces sexual inhibitions, and increases sensation (Degenhardt & Topp, 2003; Semple, Patterson, Grant, 2002). Among so-called “club drugs” or “party drugs,” methamphetamine is the most strongly associated with sexuality and sexual behaviour. In particular, it is the combination of increased social confidence, loss of sexual inhibitions, and heightened physical sensation that underlies the perceived sexual enhancement effects of methamphetamine (Kurtz, 2005). Methamphetamine does not independently or directly target specific aspects of the sexual response cycle. Rather, because methamphetamine is a powerful nervous system stimulant, it enhances a person’s general sense of well-being and excitement which, as a result, is likely to intensify and enhance sexual experiences. Methamphetamine is highly addictive in-and-of-itself. But the use of methamphetamine to lower sexual inhibitions and

enhance sexual experiences can also lead to a dependency on the drug.

There is no direct connection between the use of crystal meth and sex. As a stimulant, however, meth stimulates your libido as well as anything else. And crystal can increase your self-confidence and lower your inhibitions. It also enhances sensation. If one uses crystal in a sexually charged situation, the effect will be heightened. Because of this, people mistakenly believe that crystal caused the sexual feelings. It is indeed a very potent mixture. For many people, sex under the influence of meth rapidly leads to an incredibly strong association between the two which is hard to break. One without the other becomes inconceivable (San Francisco AIDS Foundation; [www.thebody.com](http://www.thebody.com)).

In sum, with respect to its short-term impact on sexual function, while methamphetamine does not exert direct, specific effects on the phases of the sexual response cycle *per se*, as a central nervous system stimulant, it generally enhances or intensifies feelings, desires, and sensations, including those related to sexuality.

Long-term use of methamphetamine is associated with increased risk for stroke, cardiac valve sclerosis, heart attack, reduced lung function, pulmonary hypertension, psychosis and paranoia, reduced cognitive functioning and poor mental health, including depression (Maxwell, 2005). Paradoxically, while the initial use of methamphetamine may have perceived benefits for sexual function, prolonged use of amphetamine-based drugs has been associated with erectile dysfunction and delayed ejaculation in men as well as delayed orgasm in women (Peugh & Belenko, 2001). In addition, prolonged use of methamphetamine is strongly associated with a condition called “crystal dick” in which the user maintains a strong libido, has high energy and lowered sexual inhibitions, but is unable to get an erection (Frosch, Shoptaw, Huber et al., 1996).

An assessment of the impact of methamphetamine on sexuality must take account of the strong



association between consumption of the drug and increases in unsafe sexual behaviour that places methamphetamine users at high risk for HIV and other STI. This association is explained by, among other things, the combination of lowered sexual inhibitions, high libido and energy, problems with sexual functioning (i.e., "crystal dick"), and the highly charged sexual context in which methamphetamine use often takes place. Together these factors seem to increase the likelihood for gay, bisexual, and heterosexual methamphetamine users to engage in very high HIV/STI sexual risk behaviours (Frosch, Shoptaw, Huber et al., 2004; Hirschfield, Remien, Walavalker, & Chiasson, 2004; Semple, Patterson, & Grant, 2004).

#### **COCAINE, CRACK COCAINE**

Cocaine is derived from the coca plant, the leaves of which are processed into a white powder that can be snorted or melted and then injected. Crack is a further processed form of cocaine that is smoked. The effects of crack are immediate, intense (comparable to injection), but do not last long. In general, cocaine is a central and peripheral nervous system stimulant. In particular, cocaine inhibits the reuptake of the neurotransmitter dopamine (Mateo, Budygin, Morgan et al., 2004). The buildup of dopamine that results from reuptake inhibition sends pleasurable sensations along the neural pathways, leading to feelings of well-being, self-confidence, and alertness. Ingestion of cocaine has an immediate impact on the cardiovascular system, including increased heart rate, which elevates the user's risk for heart attack and sudden death (Frishman, Del Vecchio, Sanal, & Ismal, 2003).

Cocaine does not directly or specifically impact on the human sexual response cycle. However, like for other nervous system stimulants, the feelings of well being that result from taking the drug may intensify, spark, or enhance feelings of sexual desire and sensuality. Often, new or infrequent cocaine users report that cocaine has beneficial sexual effects, most notably in increasing desire (Peugh & Belenko, 2001). In several studies, male cocaine users reported that use of the drug delayed ejaculation (Rosen, 1991).

Regular or long term use of cocaine that is snorted, injected, or smoked (crack) has significant negative

effects on overall health and on sexual functioning. Cocaine use increases an individual's risk of a variety of cardiovascular conditions including heart attack, sudden death, arrhythmia (irregular heart beat), and cardiomyopathy (Frishman et al., 2003). Chronic cocaine use has been found to be associated with reduced cognitive functioning even after the user has stopped using the drug (Bolla, Rothman, & Cadet, 1999). In addition, infants who's mothers use cocaine during pregnancy have a significantly increased risk for delayed mental/cognitive development (Singer, Arendt, Minnes et al., 2002).

While new or infrequent cocaine users may perceive a beneficial impact on sexuality, it is clear that regular or long term use of cocaine is likely to have a negative impact on sexual function. In one study of regular cocaine users, 66% of men who had been using the drug for one year or longer reported that they had difficulty getting erections (MacDonald, Waldorf, Reinerman, & Murphy, 1988). It is common for regular cocaine users to also be heavy drinkers of alcohol. In a study of men who were dually addicted to alcohol and cocaine, 62% reported low sexual desire, 52% reported erectile dysfunction, and 30% experienced delayed ejaculation (Cocores, Miller, Pottash, and Gold, 1988).

Several studies have assessed the impact on sexuality of crack cocaine. A study of male and female crack users found that 57% experienced diminished desire and 63% reported a decreased ability to have an orgasm (37% reported that crack increased their desire and 24% said that it increased their ability to have an orgasm) (Wetherby, Shultz, Chitwood et al., 1992). Contrary to the notion that crack cocaine may act as an aphrodisiac for women, a study of female crack cocaine users found that the drug diminished sexual desire and increased the likelihood of sexual dysfunction (Henderson, Boyd, & Whitmarsh, 1995).

New users of cocaine may perceive a sexual benefit to taking the drug and this effect is likely the result of the overall feelings of well being, confidence, and energy that are associated with the drug. However, it is clear the regular use of cocaine is not only detrimental to various aspects of health, it can negatively impact on the desire, arousal, and orgasm phases of the sexual response cycle.



## MARIJUANA

Marijuana is the most commonly used illicit drug in the world. Marijuana and hashish are derived from the hemp plant *cannabis sativa*. The main psychoactive ingredient in marijuana that results in the user becoming “stoned” is delta-9-tetrahydrocannabinol (THC) which produces mild euphoria, relaxation and a general enhancement of sensory experiences (Adams & Martin, 1996). Smoking marijuana can increase heart rate, increase or decrease blood pressure, and, in some users it produces anxiety or panic attacks.

In the many different cultures where it is consumed, marijuana is often associated with sexual enhancement. However, it is important to note that there has been no direct scientific investigation of the impact of cannabis consumption on the physiological components of the sexual response cycle. It is likely that, similar to the effects of other drugs on sexuality, the general feelings of relaxation and sensory enhancement that often result from smoking marijuana carry over into sexual activity.

Survey and interview research conducted with marijuana smokers suggest that many users perceive that it has a beneficial impact. In the most extensive study of the sexual effects of regular marijuana smoking, most users reported that the drug did not impact on sexual function per se (e.g., increased number of orgasms, or the ability to prolong sexual activity) but 76% of female users and 70% of male users reported that marijuana increased sexual pleasure and satisfaction and 58% of males and 36% of females reported that smoking marijuana enhanced the quality of orgasm (Halikas, Weller, & Morse, 1982). Most marijuana users in this study also reported that it had mild aphrodisiac effects. Other studies have indicated similar effects in that marijuana is perceived by the user to enhance sexual enjoyment but has little or no effect on performance/function (i.e., erection, lubrication, etc.) (Crenshaw & Goldberg, 1996).

The available research suggests that the perceived enhancement of sexual activity from the use of marijuana can be affected by a number of factors. For example, the perceived positive effects are less likely to occur as increasing amounts of the drug's

psychoactive properties are consumed. In one survey, most users (59%) believed that sexual enjoyment was increased after smoking one joint whereas less than half (39%) believed that the sexual experience would be enhanced after two or more joints were smoked (Koff, 1974). It has also been suggested that the enhancement of sexual experiences from marijuana use can be affected by the expectations of users, the setting, personality type, age, and relationship status of the users (Crenshaw & Goldberg, 1996; Rosen, 1991).

The health implications of regular, long-term marijuana use is not well understood and is the subject of considerable debate. However, it should be noted that there is medical research suggesting an association between marijuana smoking and an increased risk for medical conditions including bronchitis, emphysema, lung cancer, impaired immune function, and damage to the reproductive system (Hall & Solowij, 1998; Khalsa, Genser, Francis, & Martin, 2002).

The impact of long-term marijuana use on sexuality and sexual function is unclear as the very limited research on this topic has produced apparently conflicting results. For example, in one study marijuana users were extensively interviewed about their experiences with the drug, then re-interviewed 6 to 8 years later, with the results suggesting that the perceived sexual enhancement associated with marijuana that many experienced at the first interview was maintained at the second interview (Haikas, Weller, Morse, & Hoffmann, 1985). However, another study examining the possible association between substance use and sexual dysfunction found that inhibited orgasm and painful sex among women was independently associated with prior marijuana use (Johnson, Phelps, & Cottler, 2004).

In sum, based on the limited available research on the impact of marijuana smoking on sexuality, it would appear that although the psychoactive properties of marijuana do not directly target the phases of sexual response, smoking the drug may indirectly increase desire in some users. The frequently reported general enhancement of sensory experience felt by many marijuana users may contribute to the sense that sexual activity while under the influence of the drug is more pleasurable.



Research on the long-term impact of marijuana is severely limited but there is preliminary evidence to suggest that regular marijuana use may negatively impact on the orgasm phase of sexual response among some women.

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